

IN THE CLAIMS:

Please amend Claim 1, 6, 13, 22, 27, 34, 43, 44, 49, 50, 57 and 59 as follows. For your convenience, all the pending claims are reproduced below.

1. (Currently Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

an elongate a developing member for supplying a developer to the electrophotographic photosensitive member for developing the electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member; and

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode,

wherein an electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

2. (Canceled)

3. (Previously Presented) A device according to Claim 1, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to a developing device frame, wherein said recess opens downward.

4. (Canceled)

5. (Previously Presented) A device according to Claim 3, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

6. (Currently Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

[[a]] an elongate developing member for supplying a developer to the electrophotographic photosensitive member to develop the electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode,

a third electrode disposed between said first electrode and said developing member;

a first electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electrical signal corresponding at least to electrostatic capacities between said first electrode and second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

7. (Canceled)

8. (Previously Presented) A device according to Claim 6, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing member, said recess opening downward.

9. (Previously Presented) A device according to Claim 6 or 8, wherein said third electrode is a member which is integral with or separate from said second electrode.

10. (Previously Presented) A device according to Claim 9, further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

11. (Previously Presented) A device according to Claim 1 or 6, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

12. (Canceled)

13. (Currently Amended) A developing device for developing an electrostatic latent image formed on an electrophotographic photosensitive member, said developing device being usable with a main assembly of an electrophotographic image forming apparatus, said developing device comprising:

[[a]] an elongate developing member for supplying a developer to the electrophotographic photosensitive member to develop the electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode;

a developer path electrode disposed along a path along which the developer accommodated in a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

14. (Previously Presented) A device according to Claim 13, wherein said developer path electrode is in the form of a plate extending along the path.

15. (Previously Presented) A device according to Claim 13, further comprising a third electrode provided between said second electrode and said developing member.

16. (Previously Presented) A device according to Claim 15, wherein said third electrode is a member which is integral with or separate from said second electrode.

17. (Previously Presented) A device according to Claim 13 or 16, wherein said developing member is in the form of a developing roller.

18. (Previously Presented) A device according to Claim 13, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing member, said recess opening downward.

19. (Previously Presented) A device according to Claim 13, further comprising an intermediary electrode between said developing member and said developer path electrode.

20. (Previously Presented) A device according to Claim 13 or 16, further comprising developer stirring means for stirring the developer, wherein at least said first electrode and second electrode are disposed in a moving range of the developer provided by rotation of said developer stirring means.

21. (Previously Presented) A device according to Claim 1, 6 or 13, further comprising a stirring member for stirring the developer accommodated therein, wherein at least a lower end of said first electrode takes a position above said second electrode in a direction of movement of the developer provided by said stirring member, when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus.

22. (Currently Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member; and

(b) a developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member to develop an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member; and

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said process cartridge is mounted to the main assembly of the

electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode.

wherein an electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of the electrophotographic image forming apparatus, and is measured by the main assembly of the electrophotographic image forming apparatus to detect a remaining amount of the developer.

23. (Canceled)

24. (Previously Presented) A process cartridge according to Claim 22, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to a developing device frame, said recess opening downward.

25. (Canceled)

26. (Previously Presented) A process cartridge according to Claim 22 or 24, wherein one and the other of said first and second electrodes are plate-like and rod-like electrodes.

27. (Currently Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member; and

(b) a developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member to develop an electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;
a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode,
a third electrode disposed between said second electrode and said developing member;
a first electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus;
a second electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said developing member when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus; and
a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electrical signal corresponding at least to electrostatic capacities between said first electrode and said second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member, to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

28. (Canceled)

29. (Previously Presented) A process cartridge according to Claim 27, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to a developing device frame, said recess opening downward.

30. (Previously Presented) A process cartridge according to Claim 27 or 29, wherein said third electrode is a member which is integral with or separate from said second electrode, and is disposed opposed to said developing member.

31. (Previously Presented) A process cartridge according to Claim 30, further comprising a developer chamber having an opening in which said developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein said first, second and third electrodes are provided in said developer chamber.

32. (Previously Presented) A process cartridge according to Claim 27 or 29, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

33. (Canceled)

34. (Currently Amended) A process cartridge detachably mountable to a main assembly of an electrophotographic image forming apparatus, comprising:

(a) an electrophotographic photosensitive member; and

(b) a developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member to develop an electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second

electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode;

a developer path electrode disposed along a path along which the developer accommodated in a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of the electrophotographic image forming apparatus, a voltage to be applied to said developing member when said process cartridge is mounted to the main assembly of the electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of the electrophotographic image forming apparatus, an electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of the electrophotographic image forming apparatus.

35. (Previously Presented) A process cartridge according to Claim 34, wherein said developer path electrode is in the form of a plate extending along the path.

36. (Previously Presented) A process cartridge according to Claim 34, further comprising a third electrode provided between said second electrode and said developing member.

37. (Previously Presented) A process cartridge according to Claim 36, wherein said third electrode is a member which is integral with or separate from said first electrode.

38. (Previously Presented) A process cartridge according to Claim 34 or 37, wherein said developing member is in the form of a developing roller.

39. (Previously Presented) A process cartridge according to Claim 34 or 37, wherein said first electrode and a frame supporting said second electrode constitute a recess extending parallel to said developing member, and wherein said recess opens downward.

40. (Previously Presented) A process cartridge according to Claim 34, further comprising an intermediary electrode between said developing member and said developer path electrode.

41. (Previously Presented) A process cartridge according to Claim 34 or 37, further comprising developer stirring means for stirring the developer, wherein at least said first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

42. (Previously Presented) A process cartridge according to Claim 22, 27 or 34, further comprising a stirring member for stirring the developer accommodated therein, wherein at least a lower end of said first electrode takes a position above said second electrode in a direction of movement of the developer provided by said stirring member, when said developing device is mounted to the main assembly of the electrophotographic image forming apparatus.

43. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

- (a) an electrophotographic photosensitive member;
- (b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member; and

(c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member; and

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to a main assembly of said electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode,

wherein an electrical signal is generated in accordance with an electrostatic capacity between said first electrode and second electrode when said first electrode or second electrode is supplied with a voltage from the main assembly of said electrophotographic image forming apparatus, and is measured by the main assembly of said electrophotographic image forming apparatus to detect a remaining amount of the developer.

44. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) mounting means for mounting the process cartridge, the process cartridge including:
an electrophotographic photosensitive member;

[[a]] developing member for supplying a developer to the electrophotographic photosensitive member to develop an electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member; and

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above the second electrode when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode.

(b) electrostatic latent image forming means for forming the electrostatic latent image on the electrophotographic photosensitive member; and

(c) developer remaining amount detecting means for detecting a remaining amount of the developer by measuring an electrical signal which is produced by application of a voltage to the first electrode or second electrode and which corresponds to an electrostatic capacity between the first electrode and the second electrode.

45. (Canceled)

46. (Previously Presented) A apparatus according to Claim 43 or 44, wherein the first electrode and a frame supporting the second electrode constitute a recess extending parallel to a developing device frame, the recess opening downward.

47. (Canceled)

48. (Previously Presented) An apparatus according to Claim 43 or 44, wherein one and the other of the first and second electrodes are plate-like and rod-like electrodes.

49. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

(a) an electrophotographic photosensitive member;

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

(c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to a main assembly of said electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode,

a third electrode disposed between said first electrode and said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electrical signal corresponding at least to electrostatic capacities between said first electrode and said second electrode and between said developing member and said third electrode, when the voltages are applied to said first electrode and to said developing member; and

(d) developer amount detecting means for detecting an amount of the developer in said developing device on the basis of the electrical signal transmitted from said third electrical contact.

50. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) mounting means for detachably mounting the process cartridge, the process cartridge including:

an electrophotographic photosensitive member;

[[a]] an elongate developing member for supplying a developer to the electrophotographic photosensitive member to develop an electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed ~~opposed to the~~ along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above the second electrode when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus; wherein said second electrode is disposed closer to said developing member than said first electrode,

a third electrode disposed between the second electrode and the developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to the developing member

when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electrical signal corresponding at least to electrostatic capacities between the first electrode and the second electrode and between the developing member and the third electrode, when the voltages are applied to the first electrode and to the developing member, to detect a remaining amount of the developer by the main assembly of said electrophotographic image forming apparatus;

(b) electrostatic latent image forming means for forming the electrostatic latent image on the electrophotographic photosensitive member; and

(c) developer amount detecting means for detecting an amount of the developer in the process cartridge on the basis of the electrical signal transmitted from the third electrical contact.

51. (Canceled)

52. (Previously Presented) An apparatus according to Claim 49 or 50, wherein the first electrode and a frame supporting the second electrode constitute a recess extending parallel to the developing member, the recess opening downward.

53. (Previously Presented) An apparatus according to Claim 49 or 50, wherein the third electrode is a member which is integral with or separate from the second electrode.

54. (Previously Presented) An apparatus according to Claim 49 or 50, further comprising a developer chamber having an opening in which the developing member is supported, and a developer container, connected with said developer chamber, for accommodating the developer, wherein the first, second and third electrodes are provided in said developer chamber.

55. (Previously Presented) An apparatus according to Claim 43, 44, 49 or 50, further comprising developer stirring means for stirring the developer, wherein at least the first and second electrodes are disposed in a moving range of the developer provided by rotation of said developer stirring means.

56. (Canceled)

57. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, comprising:

(a) an electrophotographic photosensitive member;

(b) an electrostatic latent image forming means for forming an electrostatic latent image on said electrophotographic photosensitive member;

(c) a developing device for developing the electrostatic latent image formed on said electrophotographic photosensitive member, said developing device including:

[[a]] an elongate developing member for supplying a developer to said electrophotographic photosensitive member to develop the electrostatic latent image formed on said electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above said second electrode when said developing device is mounted to a main assembly of said electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode ;

a developer path electrode disposed along a path along which the developer accommodated in a developer accommodating portion moves to said developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said first electrode when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to said developing member when said developing device is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electrical signal corresponding to electrostatic capacities at least between said first electrode and said second electrode and between said developing member and said developer path electrode to detect a remaining amount of the developer by the main assembly of said electrophotographic image forming apparatus.

58. (Canceled)

59. (Currently Amended) An electrophotographic image forming apparatus for forming an image on a recording material, wherein a process cartridge is detachably mountable to a main assembly of said electrophotographic image forming apparatus, said electrophotographic image forming apparatus comprising:

(a) mounting means for detachably mounting the process cartridge, the process cartridge including:

an electrophotographic photosensitive member;

[[a]] an elongate developing member for supplying a developer to the electrophotographic photosensitive member to develop an electrostatic latent image formed on the electrophotographic photosensitive member;

a first electrode disposed along a length of said developing member;

a second electrode, disposed along a length of said first electrode, wherein said first electrode is disposed such that at least a lower end thereof takes a position above the second electrode when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus, wherein said second electrode is disposed closer to said developing member than said first electrode.

a developer path electrode disposed along a path along which the developer accommodated in a developer accommodating portion moves to the developing member;

a first electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to the first electrode when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus;

a second electrical contact for receiving, from the main assembly of said electrophotographic image forming apparatus, a voltage to be applied to the developing member when the process cartridge is mounted to the main assembly of said electrophotographic image forming apparatus; and

a third electrical contact for transmitting, to the main assembly of said electrophotographic image forming apparatus, an electrical signal corresponding to electrostatic capacities at least between the first electrode and the second electrode and between the developing member and the developer path electrode to detect a remaining amount of the developer by the main assembly of said electrophotographic image forming apparatus;

(b) electrostatic latent image forming means for forming the electrostatic latent image on the electrophotographic photosensitive member; and

(c) developer amount detecting means for detecting an amount of the developer in the process cartridge on the basis of the electrical signal transmitted from the third electrical contact.

60. (Previously Presented) An apparatus according to Claim 57 or 59, wherein the developer path electrode is in the form of a plate extending along the path.

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61. (Previously Presented) An apparatus according to Claim 57 or 59, further comprising a third electrode provided between the second electrode and the developing member.

62. (Previously Presented) An apparatus according to according to Claim 61, wherein the third electrode is a member which is integral with or separate from the first electrode.

63. (Previously Presented) An apparatus according to Claim 57 or 59, wherein the developing member is in the form of a developing roller.

64. (Previously Presented) An apparatus according to Claim 57 or 59, wherein the first electrode and a frame supporting the second electrode constitute a recess extending parallel to the developing member, and wherein the recess opens downward.

65. (Previously Presented) An apparatus according to Claim 57 or 59, further comprising an intermediary electrode between the developing member and the developer path electrode.

66. (Previously Presented) An apparatus according to Claim 57 or 59, further comprising developer stirring means for stirring the developer, wherein at least the first electrode and said second electrode are disposed in a moving range of the developer provided by rotation of said developer stirring means.